

# Range GPS System



The Atlantic Test Ranges (ATR) uses a Range Global Positioning System (RGPS)-based tracking capability designated as the Advanced Range Data System (ARDS). ARDS provides accurate Time, Space, Position Information (TSPI) under highly dynamic vehicle conditions. ARDS provides coverage of a large area comprised of air, land and sea; and multiple participant tracking capability. The ATR RGPS system is comprised of GPS-based participant pods or plate instrumentation and a ground-based Enhanced Data Link System (EDLS).

## RGPS PROJECT SUPPORT

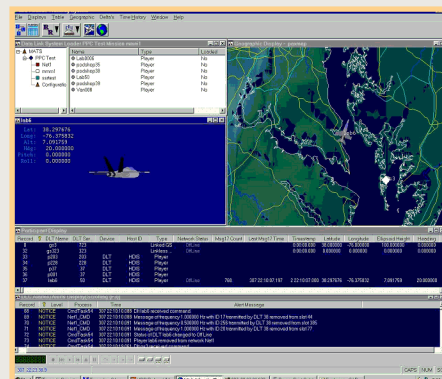
Real-time tracking support can be provided for data collection and for surveillance requirements. The ATR RGPS team supports local and remote operations across the country. RGPS personnel provide recommendations and assistance to customers to meet their objectives. The RGPS team has experience in instrumenting a wide variety of platforms ranging from "man-packs," to boats, and high-performance rotary- and fixed-wing aircraft. Any vehicle or number of vehicles can be instrumented with RGPS packages that transmit real-time data. Most packages provide a recording capability.

## ENHANCED DATA LINK SYSTEM

The Enhanced Data Link System (EDLS) manages the Time Division Multiple Access (TDMA) Radio Frequency (RF) network that supports real-time, extended area control of air, land and sea participants. EDLS uses multiple ground stations and relays to send uplink and receive downlink data, providing an expanded coverage area. It can accommodate up to 250 participants at a 1 Hz update rate, while update rates as high as 10 Hz can be selected for up to 25 participants. Real-time position data is displayed using relevant symbols overlaid on a digital map of the operating area. Displays can be tailored to provide additional information for project support.



RGPS is installed in an instrumentation hardware pod



Enhanced Data Link System (EDLS) data display

## FOR MORE INFORMATION

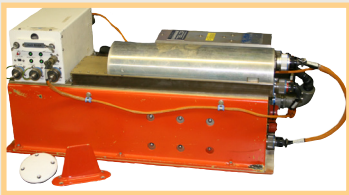
(301) 342-1180  
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Patuxent River, MD 20670  
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# Range GPS System

## ARDS TSPI MODULES

ARDS pods and plates provide highly-accurate position, velocity, acceleration and attitude data. TSPI updates can be provided at up to 10 Hz. Tracking is supported with vehicle dynamics of up to 10 gs. ARDS pods and plates are available for use on most DoD and commercial aircraft platforms. Expected accuracies are one meter horizontal and two meters vertical. Velocity accuracies are 0.8 feet-per-second horizontal and vertical, while attitude accuracies are 0.8 degrees for pitch and roll, and 1 degree for heading.

A compact, low-power GPS instrumentation package suitable for small, slow-moving participants is also available. This package is a Trimble Lassen GPS receiver integrated with either the ARDS-Lite (Freewave) or Iridium satellite data link and provides position data at 1 Hz. Expected position accuracies are nine meters horizontal and 18 meters vertical.



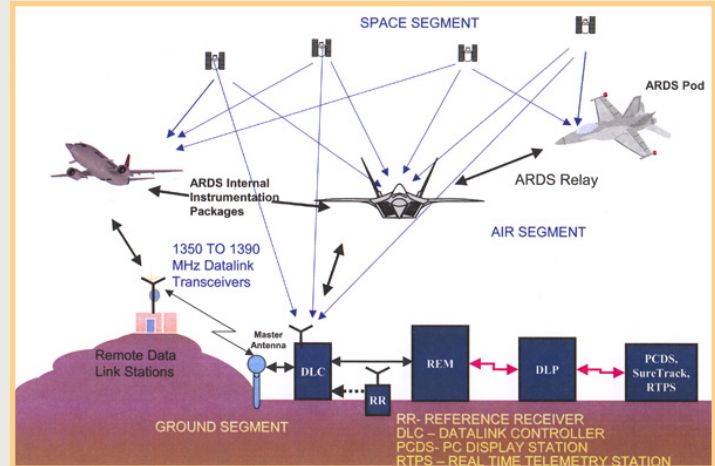
A typical ARDS package



A typical ARDS-Lite package

## GAINR

The Global Positioning System-Aided Inertial Navigation Reference, or GAINR, is a Rockwell GEM IV, 12-channel GPS receiver integrated with a modified Honeywell H-764G to provide raw inertial measurements. GAINR data is processed using a custom software suite, MOSES, developed at Edwards Air Force Base, Calif. MOSES, or the Multi-Sensor Optimal Smoother Estimation Software, has demonstrated the ability to produce centimeter-level trajectory accuracies with quality measurements in typical local-area flight dynamic conditions.



ARDS Data Link System coverage

## CARRIER PHASE GPS

Commercial Off-the-Shelf (COTS) carrier phase receivers maintained by the GPS team are operated in stand-alone/not networked mode. At the completion of the test, the recorded data is differentially corrected using local Reference Receiver (RR) corrections. Custom TSPI parameters are provided as requested. Centimeter accuracies are typical for baselines of less than 35 kilometers.

The GPS team maintains an RR network made up of COTS GPS receivers. The RR network logs data continuously, and RR data is available for a local network from three different survey sites. The GPS team can deploy and maintain RR networks at remote sites. Analysis of the RR data is provided as required.



Carrier Phase GPS Ashtech receivers: Z-sensor (left) and DG14